

## CLAIMS

1. A method for managing the dispatching of TCP segments in a wireless telecommunication network, wherein the method comprises the step of:

5        sending TCP segments to a PDCP layer;

         characterised in that the method further comprises the steps of:

         storing TCP segments on a buffer as PDCP segments, said TCP segments not being said retransmitted TCP  
10       segments;

         discarding those TCP segments whose corresponding original PDCP segments are already in said buffer;

         discarding those TCP segments that have already been positively acknowledged by a TCP receiver;

15       removing PDCP segment(s) from said buffer based on a positive TCP acknowledgement message from said TCP receiver; and

         if a negative acknowledgement is received for a PDCP segment from the RLC layer, retransmitting the  
20       PDCP segment from said buffer to said RLC layer.

2. The method according to claim 1, characterised in that the method comprises the steps of:

         extracting the TCP sequence number from a TCP segment before compressing the TCP segment header;  
25       ment

         creating a correspondence between the TCP sequence number and the PDCP sequence number;

         storing said correspondence information; and

         storing said TCP segments on a buffer in the PDCP  
30       layer as PDCP segments.

3. The method according to claim 1 or 2, characterised in that storing the TCP sequence number of the last positively acknowledged TCP segment as a limit A.

35       4. The method according to any of the claims 1, 2 or 3, characterised in that the method comprises the steps of:

receiving a positive acknowledgement message for a TCP segment from said TCP receiver;

extracting the TCP sequence number from said positive acknowledgement message;

5       checking the TCP sequence numbers of the PDCP segments in said buffer; and

removing all the PDCP segment(s) whose corresponding TCP sequence numbers are equal to or lower than said limit A from said buffer.

10       5. The method according to claim 1 or 2, characterised in that the method comprises the steps of:

reading acknowledgement messages from said RLC layer; and when an acknowledgement message is a negative acknowledgement message of a PDCP segment,

15       extracting the PDCP sequence number from said negative acknowledgement message; and

retransmitting the PDCP segment corresponding to said PDCP sequence number from said buffer to said RLC layer.

20       6. The method according to claim 1 or 2, characterised in that the method comprises the steps of:

reading acknowledgement messages from said RLC layer; and when an acknowledgement message is a positive acknowledgement message of a PDCP segment,

discarding said positive acknowledgement message.

25       7. The method according to claim 1, characterised in that the method comprises the step of:

allowing a retransmitted TCP segment to be sent to said RLC layer.

30       8. A protocol entity arranged for managing the dispatching of TCP segments in a wireless telecommunication network,

characterised in that the protocol entity comprises:

a first interface (IF1) for reading the TCP segment flow to the PDCP layer and RLC acknowledgements from the RLC layer;

a second interface (IF2) for reading TCP acknowledgements from a TCP receiver;

means for extracting (EM) a TCP sequence number from a TCP segment before header compression;

a memory (MEM) for storing the correspondence information between a TCP sequence number and a PDCP sequence number;

means for accessing (ACM) a buffer in the PDCP layer wherein the PDCP segments transmitted to said RLC layer are stored;

means for discarding (DM) a TCP segment whose original version is already in said buffer;

means for discarding (DM) a TCP segment that has already been positively acknowledged by the TCP receiver;

means for removing (REM) PDCP segment(s) from said buffer based on a positive TCP acknowledgement message from said TCP receiver; and

means for retransmitting (RM) a PDCP segment from said buffer to said RLC layer when a negative acknowledgement is received for the PDCP segment.

9. The protocol entity according to claim 8, characterised in that the protocol entity comprises a memory (MEM) for storing the TCP sequence number of the last positively acknowledged TCP segment as a limit A.

10. The protocol entity according to claim 8 or 9, characterised in that the protocol entity comprises means for allowing (AM) a retransmitted TCP segment to be sent to said RLC layer.

11. The protocol entity according to any of the claims 8, 9 or 10, characterised in that the protocol entity is arranged in said PDCP layer.

12. A system for managing the dispatching of TCP segments in a wireless telecommunication network, said wireless telecommunication network comprising at least:

- 5       an originating PDCP layer (PDPC-RNC) receiving TCP segments;
- an originating RLC layer (RLC-RNC) receiving PDCP segments from said PDCP layer;
- a receiving RLC layer (RLC-UE);
- 10       a receiving PDCP layer (PDCP-UE);
- a TCP receiver (TCP-UE);
- c h a r a c t e r i s e d   i n   t h a t   t h e   s y s t e m
- comprises a protocol entity (DTCPP) comprising:
  - a first interface (IF1) for reading the TCP seg-
  - 15       ment flow to said originating PDCP layer (RNC-PDCP)
  - and RLC acknowledgements from the originating RLC layer (RLC-RNC);
  - a second interface (IF2) for reading TCP acknow-
  - ledgements from said TCP receiver (TCP-UE);
  - 20       means for extracting (EM) the TCP sequence number
  - from a TCP segment before header compression;
  - a memory (MEM) for storing the correspondence in-
  - formation between a TCP sequence number and a PDCP se-
  - quence number;
  - 25       means for accessing (ACM) a buffer in said origi-
  - nating PDCP layer (RNC-PDCP) wherein the PDCP segments
  - transmitted to said RLC layer are stored;
  - means for discarding (DM) a TCP segment whose
  - original version is already in said buffer;
  - 30       means for discarding (DM) a TCP segment that has
  - already been positively acknowledged by said TCP seg-
  - ment receiver (TCP-UE);
  - means for removing (REM) PDCP segment(s) from said
  - buffer based on a positive TCP acknowledgement message
  - 35       from said TCP receiver (TCP-UE); and

means for retransmitting (RM) a PDCP segment from said buffer when a negative acknowledgement is received for the PDCP segment.

13. The system according to claim 12,  
5 characterised in that the system comprises a memory (MEM) for storing the TCP sequence number of the last positively acknowledged TCP segment as a limit A.

14. The system according to claim 12 or 13,  
10 characterised in that the system comprises means for allowing (AM) a retransmitted TCP segment to be sent to said originating RLC layer.

15. The system according to any of the claims 12, 13 or 14, characterised in that said  
15 protocol entity (DTCPP) is arranged in said originating PDCP layer.

16. The system according to any of the claims 12, 13, 14 or 15, characterised in that said  
20 receiving RLC layer, receiving PDCP layer and TCP receiver are located in the user equipment (UE) and/or in the radio network controller (RNC) of the wireless telecommunication network.

17. The system according to any of the claims 12, 13, 14, 15 or 16, characterised in that  
25 said originating PDCP layer and originating RLC layer are located in the user equipment (UE) and/or in the radio network controller (RNC) of the wireless telecommunication network.

18. The system according to any of the claims  
30 12, 13, 14, 15 or 16, characterised in that said wireless telecommunication network is the Universal Mobile Telecommunications System (UMTS).